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ABSTRACT

It is increasingly necessary to encourage lifelong learning in order to keep pace with the Information Age. As learners increasingly take charge of their own learning, however, they will require support to enable them to achieve their goals--and a variety of learning opportunities will need to be created. Learners' interests, imagination, and creativity are the starting points for planning computer-supported learning experiences. Learning is constructed not by computers, however, but through the interaction and the management of software tools, the desire of learners to understand their world, teachers' support and guidance, the integration of computer access and use into everyday activities, and teachers' understanding of the technology. The technical and further education (TAFE) system in Australia, through its TAFE Frontiers program, is committed to the learner-centered approach to resource development, in order to challenge and push developers' thinking beyond their immediate framework; to keep abreast of current technological advances; to guide development teams to pick the most appropriate media for their targeted learning group and learning content; and to maintain quality resources that support lifelong learning, access, and equity. The model for learner-centered education, as provided in the TAFE Frontiers' Developers Kit, should include analysis of the target learners, design for best practice, development of appropriate strategies, and review. (KC)

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Technology - an additional tool for learners

Linda Smart and Ben Fennessy

TAFE Frontiers, Victoria

What will the learners of today be engaged in at work and play in twenty, thirty or forty years from now?

Noone knows!

Today's learning context

How could we have envisaged the Internet, Call Centres and email? Could we have conceived utilising technology in work and as educational tools twenty years ago? We couldn't. So we did not prepare our learners for these future possibilities. What we know now is that change is inevitable and that we need to prepare learners for 'lifelong learning', to allow them to respond and adapt to new opportunities as they arise.

The technological age is impacting on every aspect of our lives; we have access to so much information that it is almost beyond comprehension. As educators it is imperative that we encourage the development of skills in information management.

> In times of drastic change it is the learners who inherit the future. The learned usually find themselves equipped to live in a world that no longer exists.
> (Hoffer 1989)

The increasing speed of information generation provides both a need and a desire for an increased ability to grasp and apply knowledge, at the same time as we are developing an understanding about how we learn. This is shedding light on how to increase our learning abilities. We have come to understand that people are born as natural learners. We don't lose this ability for lack of nurturing, nor to the aging process.

We have an increasing awareness of the need to encourage lifelong learning as our way of keeping pace with the Information Age. In some sectors of our society, lifelong learning is being embraced. However, some individuals have resisted this change in the form of general apathy, entrenched opinions, and fear of change. But time marches on. Probability law says that if it can happen it will happen eventually. How can we hasten the coming of the learning society? This has to be through education and learners.

Transforming our learning culture will depend on a partnership between individual responsibility and the wider community. As learners increasingly take charge of their own learning and determining their need for skills, they will require support to enable them to achieve their goals.

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Systematic lifelong learning can significantly help develop people's skills, orientations and confidence to navigate the many risks, uncertainties and ambiguities of contemporary life. It constitutes a key resource, enabling people to participate in the shaping of society to take advantage of social and educational change, rather than be its possible victims.

> Education is about change. Fundamentally. Why? Because almost everything we know about education is up for grabs: the way it is funded, designed, managed and even delivered. Around the world, wholesale efforts at education reform are already underway; and these changes are taking place in "Internet time". This is the new education economy- the global education economy.
> (The New Education Economy 1999)

It is also important to recognise that, just as social change must proceed on many different fronts, so too a variety of different learning opportunities will need to be created. There is no 'one best way' or universally applicable type of learning style, irrespective of people's circumstances or the organisational or institutional settings they find themselves in.

Preparing learners for this social and educational change and embracing it has to become a priority.

Learners need not be tied to particular locations. They are able to study at home, at work, or in a local library or shopping centre, as well as in TAFE institutes and universities. People are able to study at a distance using broadcast media and online access. Our aim must be to help learners gain the maximum from these opportunities, and to achieve this, educators must learn how to identify what medium is appropriate and support learners in assessing how they are doing and where they want to go next.

As location becomes less of an issue, the family takes on a bigger role in facilitating learning and can contribute to the reversal of a sometimes vicious downward spiral of under achievement, low grade employment, unemployment, poverty, low self-esteem, poor quality of life and social exclusion. It also provides a valuable context for inter-generational learning that could include shared access to, and pleasure in using, information and communications technology.

The technology

Learners' interests, imagination and creativity are the starting point for planning computer-supported learning experiences. Learners should be able to select a computer-based activity just as they would any other activity - on the basis of interest to them as an individual or as a group exploration.

> The goal must be to build learning strategies and assessment systems that will motivate young people to want to go on learning.
> (Hodgson - *Creating lifelong learners: a new and inclusive vision*)

Intellectual development occurs through interactions and joint problem solving with people more skilled than the learner. In developing learners' thinking, we must value interaction and give appropriate guidance to solve problems and construct knowledge.

Computer-based learning can provide this support through pre-structured content and in-built cognitive supports, eg feedback, sequencing, multiple representations of material, and the predictable flow of activity.

Computers do not bring about learning; it is constructed through:

- the interaction and the management of the software tools
- the desire of learners to understand their world
- teachers' support, guidance and coaching
- the integration of computer access and use into everyday activities
- teachers' levels of familiarity and understanding of the technology.

One of the challenges in applying technology is to motivate educators to facilitate this new culture of learning. This will be critical if learners are to embrace new learning opportunities. As educators we must challenge our own fears and prejudices about embracing technological opportunities to enhance the learning process. There is still resistance to the use of technological tools. After all, it is seldom the learner who is reluctant to acquire new skills; a judgement is made based on the values of the system and attitudes as to whether the learner needs to acquire those skills. We should be moving towards a time when the opportunity for learners to use technological tools is a given, and no different for them than picking up a book or walking into a traditional classroom.

This can be done by:

- encouraging people to have *higher expectations* of themselves and of others;
- providing learning *at a time and a place to suit* the individual;
- ensuring that all learning has high standards of teaching and training;
- providing *information and advice* to people to clear a way through the jungle of jargon and initials;
- making learning welcoming; and
- *giving people the support they need* in order to learn; for instance assisting with meeting the costs of learning, or improving access for someone who has a disability.

The development of technology-based systems must:

- enable changes in teaching, learning and assessment practices - from classroom and teacher-centred to learner-centred - with the required level of learner support to promote successful outcomes;
- be able to be resourced, maintained and sustained within available resources and funding; and

- be available and accessible to all learners, and based on sound pedagogic principles.

I encourage educators to take control of this new learning tool, by:

- Demanding appropriate training and formal education
- Researching best practice principles in using technological tools
- Budgeting for equipment that will provide real opportunities for learners
- Changing Curriculum/Training Packages to reflect the incorporation of technological tools
- Promoting a family learning approach
- Individually embracing and developing skills in managing information.

We can only imagine what the learners of today will be engaged in - at work and play - in twenty, thirty or forty years from now. What we can do is prepare them for the possibilities and the ability to embrace change and become positive contributors in our evolving society.

Using design to enhance the learning experience

TAFE Frontiers is responding to the rapid rate of technological change in the education area. Through our development cycle and developers kit, we are attempting to create resources that make the shift to enhance and assist lifelong learning. The learner will be the ultimate beneficiary of such a process, with programs tailored specifically to the learner and the learning cohort; programs that speak to the learner, offering encouragement, inclusion and support.

> Traditionally, curriculum developers and instructional designers set goals and objectives. The designer that is expected to teach the objectives to the student selects instructional strategies. Both content and strategy are therefore imposed on the student from the outside. Under constructivism, however, students develop their own learning strategies and often their own goals and objectives ...
> (Winn - 'The assumptions of constructivism and instructional design', in Duffy and Jonassen 1992, p 18)

I am an enthusiast and an 'early adopter' of new technology. In my previous job I was involved, from a design perspective, in the development of multimedia and online learning materials. While there was consultation with user groups, it was minimal. As developers, we would decide the most appropriate interface, tools and support technologies for online and multimedia resource developments. It was well-intentioned techno-enthusiasm. The products sometimes 'hit the mark' with students and tutors, but more often than not, products produced in this way were often shelved or not used at all. How could this happen? Very simply, poor uptake by learners was due to:

- Lack of computer experience
- No professional development or marketing plan
- Limited access to the computers and the Internet
- Products too sophisticated

- Too many plugins needed
- A high-end computer needed to run products
- Inappropriate language, look and feel
- Artistic and 'techno boffin' approaches to multimedia and online development often took precedence over learners' needs.

Question: Why did you include a Flash animation for this unit? Answer: Because we can!

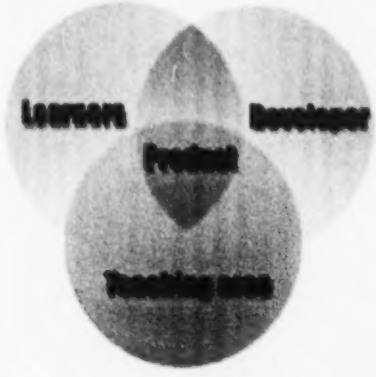
I think it has a lot to do with the beguiling nature of new technologies and its capacity to make us gasp in wonder. Jamerson, a writer on postmodernism, argues that we were once in awe of the natural world, but now technology has replaced this effect as the source of transcendental power:

> great expectations surround the new and emergent electronic technologies. It is assumed whether implicitly or explicitly that the use of new electronic technology will result in more efficient and effective teaching and learning in higher education.
>
> (Robert Fox Office of Teaching and Learning, Curtin University of Technology. Cited in: 'What are the shortcomings inherent in the non-problematic perception of new technologies?')

For some multimedia course designers, the 'bells and whistles' approach is seen to be covering all bases, allowing learners to access material in a way that suits their learning style. But it may actually decrease the effectiveness of instruction. Some recent research into 'cognitive load theory' suggests we can only process a few elements or chunks of information at one time.

> The cognitive load theory is based on the assumption that a person has a limited processing capacity, and that proper allocation of cognitive resources is critical to learning.
> (Slava Kalyuga: 'When using sound with a text or picture is not beneficial for learning', Australian Journal of Educational Technology)

In my experience, I think we failed to investigate and analyse the learners in enough detail, let alone include them in the process. The students and tutors had not been consulted during the development cycle. I believe this non-inclusive attitude needs to be broken down and replaced with a fostering of real partnerships and collaboration between the *learners*, the *teaching area* and the *developers*.



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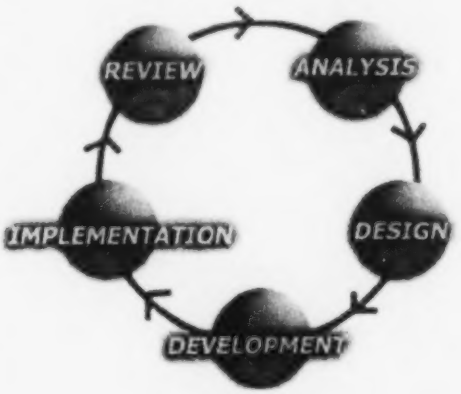
TAFE Frontiers is charged with extending and developing the uptake of flexible learning in the VET area. We believe this partnership between the three stakeholders, teachers, developers and students will be a key tool for enabling this uptake. The partnership encourages a self-directed learning model, and materials that involve the learner in determining what will be the outcomes and how the learning will occur. Learners are enjoying 'having a say' in their education. Development teams report that learners feel empowered with a sense of 'this is for me'. Trainers' inclusion in project development gives them some ownership and offers professional development of the final product they will ultimately be delivering.

Technological issues are of course only one aspect of design and development of successful and engaging learning materials. Socioeconomic, study requirements, language difficulties, age and family responsibilities are all issues that can inform appropriate development. With the wide uptake of National Training Packages across the curriculum spectrum, this intelligence gathering becomes particularly important. For example, mature age students seem to understand the implications, the practical approach and focus of Competency Base Training as leading into the workplace, while recent school leavers appear to see TAFE as an extension of school and lack the understanding of training for 'on the job'.

> Moreover if course content fails to address concerns related to important goals and aspirations such as becoming proficient in the workplace or course processes leave the student feeling powerless and uncomfortable, then frustration and anger are likely to result.
> (Pauline James: 'Student concerns and Competency Base Training Difficulties and coping strategies in vocational courses', Australian Journal of Educational Technology)

The process

TAFE frontiers' product development cycle sets out the model for creating *learner-centred* products.



Involving and collaborating with learners and teachers in all aspects of TAFE Frontiers' development cycle is our approach to developing effective engaging learning resources. Involving teachers in the development of online materials will

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result in upskilling, and a more seamless bridging from traditional methods to online and multimedia approaches to teaching.

> For many academics, the required changes – from 'traditional' university teaching to the development of online materials, are dramatic and challenging. New approaches to teaching and learning, the strengths and limitations of different technologies, catering to different styles of learning and effective learning environments require a new set of skills.
> (Burford and Cooper: 'Online development using WebCT: a faculty managed process for quality', Australian Journal of Educational Technology, vol 16, no 3)

Our online developments aim to encourage active learning encouraging knowledge construction, and challenging learners to: develop their own understanding; build and develop skills such as problem solving, reflective thinking and information technology literacy; and apply learning to meaningful contexts such as their own backgrounds/work settings.

Analysis

The analysis phase describes the attributes of the target learners, identifying and confirming any special factors relevant to design - ie motivation, context, industry changes, similar or complementary products and appropriate delivery formats and media types for the target group.

Design

The design phase uses the TAFE Frontiers Developers Kit to provide specifications of basic requirements and guidelines for best practice. Building from this framework, developers will be encouraged to seek innovative solutions and approaches, to increase suitability of resources for independent learning and to provide effective support to learners. This could include, for example, involving teachers and learners in reference and focus groups in order to discuss appropriateness of look and feel, navigation and sequencing of materials.

Development

The development phase requires appropriate strategies for interaction with learners and user groups to test design, content, learning activities and assessment approaches. Here, appropriate projects include product marketing strategies, and showing how products will be promoted, integrated and used in the State Training Service.

Review

As well as a formal report, an informal debriefing will complement the written evaluations of the process. Also a twelve-month product maintenance clause is written into project briefs.

By incorporating these strategies into the product development cycle, TAFE Frontiers is confident it will lead to greater uptake of flexible delivery options and offer real choice in learning for students within the VET system.

The Victorian context

All online learning materials developed by TAFE Frontiers conform to the Victorian Government's initiative: the TAFE Virtual Campus. The Government's 'Flexible Learning Strategy' encourages resource developments that are equitable, flexible and engaging. These could involve including planned learning activities that feature group discussion, and other collaborative activities using the communication facilities of the TAFEVC.

In conclusion, this model of development practice is informing TAFE Frontiers' 'next generation' of exciting products; products that engage and support learners' intrinsic motivation to explore and learn.

As discussed earlier in the design phase, a key tool for implementing this development cycle is the TAFE Frontiers Developers Kit. This kit includes guidelines for best practice online and templates for paper-based, online and multimedia developments.

Developers Kit

In establishing a development cycle that keeps developers focused on the outcomes for learners, we can then provide a framework that facilitates this process. As a living, evolving document, we endeavour to support and challenge developers to look beyond traditional methodology by providing a set of development tools. This set of tools informs and guides development teams, linking the end resource back into the development cycle and the learner-centred approach.

The Kit

A set of principles

The principles have been developed to reflect our understanding that the learner is the focus for our activity and that the tools we have available support - not drive - this approach. The principles are divided into the following subset:

- Focus on the learner
- Encourage active learning
- Communicate effectively with the learner
- Promote lifelong learning
- Develop materials that are current
- Develop materials that are versatile.

They can be used by learners with a range of particular needs.

Best practice examples

This section provides examples from previous development teams at each stage of the development cycle. We hope to challenge development teams to look beyond their immediate thinking and promote quality processes, which can also provide editable models that can be adapted, rather than continuously reinventing the wheel.

Online and multimedia guidelines

These guidelines provide both the technical specifications and suggested pedagogical and design standards. This is a dynamic area, and we recognise the need to capture the best of current knowledge and make it more accessible to development teams. The challenge is to clarify the constraints and potential of the new and emerging media.

Print templates

The templates have been developed to provide options for developers based on the target learners. There is a choice of three templates for the Learning Resource which provides the content and learning activities. The templates vary in key features such as font size, column width and use of white space. This provides developers with a repertoire of graphic layout styles to better meet the needs of the learner.

Fonts and icons

The fonts and icons have been chosen for their usability, readability and legibility. They set a consistent look and standard for print-based resources.

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Publishing guide

The publishing guide includes a range of tools:

- a house style guide that provides editing standards for consistent usage
- a glossary of key terms in flexible and online delivery
- a guide to using the print templates
- a guide to requirements for online and multimedia publishing.

Copyright guidelines

All material developed through TAFE Frontiers is copyright to the State of Victoria, and material acquired from other sources must have copyright clearance. The copyright information provides guidelines to developers on how to identify copyright material and the process for using copyrighted material. It also contains a clearance request form.

The Developers Kit will continue to be actively updated and will respond to feedback from current development teams and technological changes.

To conclude

TAFE Frontiers is committed to the learner-centred approach to resource development, in order to:

- challenge and push developers thinking beyond their immediate framework;
- keep abreast of current technological advances;
- guide development teams to pick the most appropriate media for their targeted learning group and learning content; and
- maintain quality resources that support lifelong learning, access and equity.

What will the learners of today be engaged in - at work and play - in twenty, thirty or forty years from now? We don't know, but we can prepare them to be active learners who embrace change and are driven by the desire for lifelong learning, not the latest piece of technology.

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